Procurement Specification Cover Sheet

1. Title			
TECHNICAL SPECIFICATION FOR MELTER VESSEL ASSEMBLY FOR THE DEFENSE WASTE PROCESSING			
FACILITY (U) - PROJECT #LW-5901			
2. Specification No. M-500	3. Revision 6		4. Page 1 of 23
5. Functional Classification SC	6. Requester Department DWPF Design Engineering	7. Requester Division PD&CS	
8. Cognizant Technical Function			
Name Zahid Dasti			Date 1/7/08
Title Mechanical Engineer			
Department PD&CS / Design Engineering			
9. Additional Reviewer			
Name William Bruss			Date 1/7/08
Title Lead Mechanical Engineer			
Department PD&CS / Design Engineering			
10. Cognizant Quality Function			
Name Bruce Dragon			Date 1/7/08
Title Quality Engineer			
Department PD&CS / Quality Engineering / Waste Solidification			
11. Manager			
Name Achyut Patel			Date 1/8/08
Title Project Engineer			
Department PD&CS / Design Engineering			
12. Other ~~Approver~~ Reviewer JG 1-8-2008			
Name Allan Weikel for G Dahlstrom			Date 1-8-2008
Title Lead - Core Specification Team			
Department PESG			

ENGINEERING DOC. CONTROL-SRS
00833893

Standard Procurement Specification Revision History Sheet

1. Specification No. M-500			2. Revision No. 6	3. Page 2 of 23
4. Date	5. Revision No.	6. Paragraph No.	7. Description of Changes	
2/24/2005	4	N/A	Incorporated SDDR's #00950 and #00951. No change made.	
		3.0	Added E499 and SA 479. Deleted "(with 2002 Addenda)" from	
			NQA-1	
		3.1	Updated revision numbers. Added drawing W770404	
		4.1.4	Second bullet, deleted "Any"	
		5.2.8	Deleted "alternate"	
		5.3.1	Changed "B31.1" to "B31.3"	
		7.1.2	Witness points, heat treatment, deleted "first (if required)". Hold	
			points, added "/Helium" to halide leak tests.	
		7.2.2	First sentence, added "and final dimensional".	
		9.4	Revised	
		Att. 11.3	Deleted NQA-1 Part II Subpart 2.7 requirement. Added NQA-1,	
			Element 3, Supplemental Requirement 401, "Use of Computer	
			Programs".	
2/20/2007	5	N/A	Incorporated SDDR #00950 into drawing W840460 (for Melter 3 only).	
			No changes required for the specification.	
		N/A	Incorporated SDDR #00951 into drawing W840461 (for Melter 3 only).	
			No changes required for the specification.	
		3.0	Updated Codes and Standards to the current active year.	
		3.1	Deleted revision numbers from reference documents.	
		4.2	Revised Section (removed ANSI year of issue)	
		7.1.2	Added witness point (from lessons learned program).	
		11.1 thru 11.3	Added number of pages to Attachments	
1/8/2008	6	3.0	Revised NQA-1 year from 2004 to 2000 (p. 7)	

TABLE OF CONTENTS

SECTION PAGE

1.0 PURPOSE 4

2.0 SCOPE 4

3.0 CODES AND STANDARDS 4

4.0 DESIGN CONDITIONS 14

5.0 MATERIALS 15

6.0 TESTING, INSPECTION AND CERTIFICATION 18

7.0 WSRC INSPECTIONS 20

8.0 QUALITY REQUIREMENTS 22

9.0 PREPARATION FOR SHIPMENT 22

10.0 DOCUMENTATION 22

11.0 ATTACHMENTS 23

1.0 PURPOSE

The purpose of this specification is to define the requirements for the Melter Vessel Assembly and Melter Vessel Support Frame for the Defense Waste Processing Facility (DWPF).

2.0 SCOPE

2.1 Work Included

Provide labor and materials to furnish design, fabrication, assembly, inspection, testing, documentation and delivery of the Melter Vessel, Melter Vessel Support Frame and all interconnecting piping and wiring.

Prepare and submit engineering documents and quality verification documents as required by Attachments 11.1 and 11.2.

2.2 Work Not Included

Final assembly of the Melter and other components will be performed by WSRC at the Savannah River Site (SRS).

2.3 Definitions

CMTR	Certified Material Test Report
EDR	Engineering Document Requirements
QVDR	Quality Verification Document Requirements
SDDR	Supplier Deviation Disposition Request
SSR	Supplier Surveillance Representative
WSRC	Washington Savannah River Company
Hold Point	A mandatory inspection activity beyond which work shall not proceed until (1) inspection is performed by an independent inspector/peer inspector and acceptance is authenticated, or (2) written release is authorized by Engineering.
Witness Point	An inspection activity beyond which work shall not proceed until an inspector is notified and (1) inspection is performed and released, or (2) the inspection is deferred and can be completed at a later time, or (3) the witnessing of the work activity by the inspector is waived by Engineering.

3.0 CODES AND STANDARDS

Items supplied shall conform to this specification, other specifically referenced Project Specifications and to the applicable following Codes and Standards. Use of any other editions and/or addenda of National Codes and Standards shall require WSRC acceptance via submittal of a SDDR.

American Society for Testing and Materials (ASTM)

A182/A182M-06	Standard Specification for Forged or Rolled Alloy-steel Pipe Flanges, Forged Fittings, and Valves and Parts for

	High-Temperature Service
A193/A193M-	Standard Specification for Alloy Steel and Stainless Steel Bolting Materials for High-Temperature Service
A194/A194M-	Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High-Pressure or High-Temperature Service, or both
A240/A240M-	Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and General Applications
A268/A268M-	Standard Specification for Seamless and Welded Ferritic and Martensitic Stainless Steel Tubing for General Service
A269-	Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service
A276-	Standard Specification for Stainless Steel Bars and Shapes
A312/A312M-	Standard Specification for Seamless and Welded Austenitic Stainless Steel Pipes
A351/A351M-	Standard Specification for Castings, Austenitic, Austenitic-Ferritic (Duplex) for Pressure Containing Parts
A358/A358M-	Standard Specification for Electric-Fusion-Welded Austenitic Chromium-Nickel Alloy Steel Pipe for High-Temperature Service
A403/A403M-	Standard Specification for Wrought Austenitic Stainless Steel Piping Fittings
A450/A450M-	Standard Specification for General Requirements for Carbon, Ferritic Alloy, and Austenitic Alloy Steel Tubes
A479/A479M-	Standard Specification for Stainless Steel Bars and Shapes for use in Boilers and Other Pressure Vessels
A480/A480M-	Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip
A484/A484M-	Standard Specification for General Requirements for Stainless Steel Bars, Billets and Forgings
A500-03a	Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
A554-03	Standard Specification for Welded Stainless Steel Mechanical Tubing
B96/B96M-	Standard Specification for Copper-Silcon Alloy Plate, Sheet, Strip and Rolled Bar for General Purposes and Pressure Vessels
B98/B98M-03	Standard Specification for Copper-Silcon Alloy Rod, Bar and Shapes
B187/B187M-	Standard Specification for Copper, Bus Bar, Rod, and

	Shapes and General Purpose Rod, Bar and Shapes
B366-04b (E/2006)	Standard Specification for Factory-Made Wrought Nickel and Nickel Alloy Fittings
B568-98 (R/2004)	Standard Test Method for Measurement of Coating Thickness by X-Ray Spectrometry
B571-97 (R/2003)	Standard Practice for Qualitative Adhesion Testing of Metallic Coatings
B574-06	Standard Specification for Low-Carbon Nickel-Molybdenum-Chromium, Low-Carbon Nickel-Chromium-Molybdenum, Low-Carbon Nickel-Molybdenum-Chromium-Tantalum, Low-Carbon Nickel-Chromium-Molybdenum-Copper, and Low-Carbon Nickel-Chromium-Molybdenum-Tungsten Alloy Rod
B622-06	Standard Specification for Seamless Nickel and Nickel-Cobalt Alloy Pipe and Tube
B700-97 (R/2002)	Standard Specification for Electrodeposited Coatings of Silver for Engineering Use
D257-99 (R/2005)	Standard Test Methods for DC Resistance or Conductance of Insulating Materials
E499-95 (R/2000)	Standard Test Methods for Leaks Using the Mass Spectrometer Leak Detector in the Detector Probe Mode
F436-04	Standard Specification for Hardened Steel Washers

American Society of Mechanical Engineers (ASME)

Melter Vessel Design and Fabrication – Use ASME 1986 Edition including 1987 Addenda

Section V	Nondestructive Examination
Section VIII	Boiler and Pressure Vessel Code, Division 1
Section IX	Welding and Brazing Qualifications

Melter Vessel Materials – Use ASME 2004 Edition including 2005 and 2006 Addenda

SA182/SA182M	Specification for Forged or Rolled Alloy Steel Pipe Flanges, Forged Fittings and Valves and Parts for High-Temperature Service
SA193/SA193M	Specification for Alloy Steel and Stainless Steel Bolting Materials for High-Temperature Service
SA194/SA194M	Specification for Carbon and Alloy Steel Nuts for Bolts for High-Pressure or High-Temperature Service or Both
SA240	Specification for Heat Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels
SA312/SA312M	Specification for Seamless and Welded Austenitic Stainless Steel Pipes

SA403/SA403M	Specification for Wrought Austenitic Stainless Steel Piping Fittings
SA479/SA479M	Specification for Stainless Steel Bars and Shapes for Use in Boilers and other Pressure Vessels

Standards

B1.5-97 (R/2004)	Acme Screw Threads
B16.5-03	Pipe Flanges and Flanged Fittings, NPS ½ Through NPS 24 Metric/Inch Standard
B16.9-03	Factory-made Wrought Butt Welding Fittings
B16.25-04	Buttwelding Ends
B3l.3-04	Process Piping
B36.10M-04	Welded and Seamless Wrought Steel Pipe
B36.19M-04	Stainless Steel Pipe (R1994)
B46.1-02	Surface Texture (Surface Roughness, Waviness and Lay)
NQA-1-2000	Quality Assurance Requirements for Nuclear Facility Applications
Y14.5M-82	Dimensioning and Tolerancing

Uniform Building Code – 1985 Edition

American Society for Nondestructive Testing (ASNT)

SNT-TC-1A	Recommended Practice No. SNT-TC-1A (2001 Edition)

Pipe Fabrication Institute (PFI)

ES-3-04	Fabricating Tolerances

American Welding Society (AWS)

D1.6-99	Structural Welding Code-Stainless Steel

American Institute of Steel Construction (AISC)

Manual of Steel Construction, Eighth Edition, including

- Code of Standard Practice for Steel Buildings and Bridges (1986)
- Specification for the Design, Fabrication and Erection of Structural Steel for Buildings

National Fire Protection Association Standard (NFPA)

70-2005	National Electrical Code (NEC)

National Electrical Manufactures Association (NEMA)

WC 53-2000	Standard Test Methods for Extruded Dielectric Power, Control and Instrumentation Cables for Test

NACE International

NACE No. 2/SSPC-SP-10 Near White Metal Blast Cleaning (2000)

Code of Federal Regulations

29CFR Part 1910 Occupational Safety and Health Standards (Edition)

40CFR Part 143 National Secondary Drinking Water Regulations (Edition)

3.1 Applicable Documents

Technical Specifications

M-501	Technical Specification for Melter Vessel
M-502	Technical Specification for Melter Vessel Assembly (Split Scope)
E-501	Technical Specification for Melter Assembly Cable and Connectors
P-501	Technical Specification for Melter External Piping
S-501	Technical Specification for Structural Stainless Steel for Melter Assembly Support Frames
G-6	General Specification Project Requirements for Supplier Handling of Dimensional Record Drawings for the Defense Waste Processing Facility
G-307A	Project Specification for Welding Requirements of Carbon Steel, Stainless Steel and Nickel Alloy Critical Fabricated Components for the Defense Waste Processing Facility
M-SPC-S-00001	Technical Specification for Project Requirements for Purchase Orders for the Defense Waste Processing Facility
M-SPC-S-00004	Welding Requirements for Austenitic Stainless Steel and Nickel Alloys for ASME Section VIII Vessels and Components for the Defense Waste Processing Facility
M-SPC-S-00005	Chemical Requirements for Materials Used in Contact with Austenitic Stainless Steel, Nickel and Nickel Alloys for the Defense Waste Processing Facility

Data Sheets

DS-E-1924 Cable Routing on Melter 3 Frame

DS-M-502-1	Level Dip Tube
DS-M-502-2	Thermowells
DS-M-502-3	Melter TV Camera
DS-M-502-4	Melter Feed Tubes

DS-M-502-5	Side Electrodes
DS-M-502-6	Dome Heaters
DS-M-502-7	Dome Heater Bus Bars
DS-M-502-8	Dome Heater Transformers
DS-M-502-9	Melter Frame Assembly
DS-M-502-10	Terminal Connection
DS-M-502-11	Drain Valve Installation
DS-M-502-12	Bus Bar Assemblies
DS-M-502-13	Flange Isolation
DS-M-502-14	Thermocouples (Melter Body)
DS-M-502-15	Thermocouples (Melter Head)
DS-M-502-16	Piping and Conduit
DS-M-502-17	Pour Spout Guard
DS-M-502-18	Fiberfrax Blanket
DS-M-502-19	Quencher Orientation Guide
DS-M-502-20	Melter Head Installation and Removal
DS-M-502-21	Riser and Pour Spout
DS-M-502-22	Melter Frame Datum Marks
DS-M-502-23	Seal Pot Mounting
DS-M-502-24	Canister Positioner
DS-M-502-25	Frame Mounted Nozzles and Electrical Lower Holders
DS-M-502-26	Melter Frame TV
DS-M-502-27	Electrical Lower Holder Assembly

Drawings

PV813205	Shell Assembly – DWPF Melter
D822975	Shell – Sheet 17
D822976	Shell – Sheet 18
D822977	Shell – Sheet 19

D822978 Shell – Sheet 20

D822979 Shell – Sheet 21

D822980 Shell – Sheet 22

D822981 Sheet – Sheet 9

D822982 Top Head Details – Sheet 4

D822983 Top Head Details – Sheet 5

D822984 Top Head Details – Sheet 6

D822985 Top Head Details – Sheet 7

D822986 Top Head Details – Sheet 8

D822987 Top Head Details – Sheet 9

D822988 Top Head Details – Sheet 10

D822989 Top Head Details – Sheet 11

D822990 Top Head Details – Sheet 13

D826341 Shell – Sheet 15

D826342 Shell – Sheet 16

D826343 Shell – Sheet 14

D826344 Shell – Sheet 13

D826345 Top Head Details – Sheet 3

D826346 Shell – Sheet 11

D826347 Top Head Details – Sheet 12

D826348 Shell – Sheet 12

D826349 Top Head Details – Sheet 1

D826350 Top Head Details – Sheet 2

D826851 Shell – Sheet 1

D826852 Shell – Sheet 2

D826853 Shell – Sheet 4

D826855 Shell – Sheet 7

D826856 Shell – Sheet 3

D826857	Shell – Sheet 5
D826858	Shell – Sheet 10
D826859	Shell – Sheet 8
D826860	Shell – Sheet 6
D830751	Shell – Sheet 23
W750105	Melter Cooling Water Conn. (sheet 1 of 4) – P&ID
W750106	Melter TV Camera Air Supply – P&ID
W750107	Melter Electrodes (sheet 1 of 2) – P&ID
W750108	Melter Cooling Water Conn. (sheet 2 of 4) – P&ID
W750110	Melter Feed System – Melt Cell – P&ID
W750115	Melter Pressure-Relief Seal-Pot – P&ID
W750201	Melter Bellows Air – P&ID
W750203	Melter – Quencher – P&ID
W750204	Melter Cooling Water Conn. (sheet 3 of 4) – P&ID
W750205	Melter Cooling Water Conn. (sheet 4 of 4) – P&ID
W750230	Melter Transformers (sheet 1 of 5) – P&ID
W750231	Melter Dome Heater Transformers (sheet 1 of 2) – P&ID
W750234	Melter Electrodes (sheet 2 of 2) – P&ID
W750236	Melter Transformers (sheet 2 of 5) – P&ID
W750237	Melter Dome Heaters (sheet 1 of 4) – P&ID
W750239	Melter Thermocouples – P&ID
W750296	Melter Drain Valve – P&ID
W750297	Melter Dome Heaters (sheet 2 of 4) – P&ID
W750301	Melter Transformers (sheet 3 of 5) – P&ID
W750302	Melter Transformers (sheet 4 of 5) – P&ID
W750303	Melter Dome Heaters (sheet 3 of 4) – P&ID
W750304	Melter Dome Heaters (sheet 4 of 4) – P&ID
W750306	Melter Dome Heater Transformers (sheet 2 of 2) – P&ID

W750307	Pour Turntable (sheet 2 of 2) – P&ID
W753098	Electrical Lower Holder
W753312	Melter Frame Lifting Yoke Assembly
W753330	Standard Acme Nut
W753610	Process Nozzle Standard for Tilt and Orientation
W753611	Dowel, Stud and Lower Holder Standard for Tilt and Orientation
W769406	Thermocouple Assembly – Drain Valve Zones 2, 3, 4 and 5
W770340	Single Line Diagram – Glass Melter Power Supply
W770398	Electrical Lower Holder Assemblies – Sheet 1 of 2
W770399	Electrical Lower Holder Assemblies – Sheet 2 of 2
W770404	Electrical Upper Holder Assemblies – Sheet 2 of 2
W772201	Electrical Jumper and Penetration Schedule (sheet 1 of 6)
W772203	Electrical Jumper and Penetration Schedule (sheet 3 of 6)
W836882	Melter Component Installation – Plan View
W836883	Melter Component Installation – Connection Schedule – Primary
W836884	Melter Component Installation – Connection Schedule – Aux.
W836885	Melter Component Installation – Side Elevation
W836886	Melter Component Installation – Aux. Equip. T/C Installation
W837667	Refractory Assembly – Sheet 2 of 2
W840458	Glass Melter Vessel Support Framing Plans
W840459	Glass Melter Vessel Support Elevation and Sections
W840460	Glass Melter Vessel Support Elevation, Sections and Details
W840461	Glass Melter Vessel Support Details and Sections – Sheet 1 of 2
W840462	Glass Melter Vessel Support Details and Sections – Sheet 2 of 2
W840481	Melter Vessel Assembly Wiring Diagram
W840482	In-Cell Connection Diagram – Drain Valve Heaters
W840483	In-Cell Connection Diagram – Melter Dome Heater Transformers

W840484 In-Cell Connection Diagram – Off-Gas/BUOG Line Brushes and Off-Gas Line Isolation Valve MOV-3689

W840485 In-Cell Connection Diagram – Riser and Pour Spout Heaters

W840488 In-Cell Connection Diagram – MOV-3322, MOV-3324 & Can. Position Arm

W840489 In-Cell Connection Diagram – MOV-3324, Canister Position Arm & Drain Valve Position Switches

W840490 In-Cell Connection Diagram – Melter Off-Gas Film Cooler, Refractory & Miscellaneous Heater Thermocouples

W840491 In-Cell Connection Diagram – Melter Electrode L2, Refractory & Miscellaneous Heater Thermocouples

W840492 In-Cell Connection Diagram – Melter Electrodes L1, L3 & L4, & Miscellaneous Heater Thermocouples

W840601 Melter Frame Nozzle Mounting

W840602 Melter Frame Nozzle Mounting Plates

W840603 Melter Frame Nozzle Installation

W840604 2 Inch Standard Dowel

W840605 Acme Stud

W840606 Miscellaneous Piping Details

W840607 Pipe Connector Flanges

W840609 Melter Pour Spout Guard

W840610 Canister Positioning Arm Support Bracket

W840611 Off-Gas and BUOG Quencher Orientation Guides Details

W840612 Melter Bus Bars Electrodes L2 and L4

W840613 Melter Bus Bars Electrodes L1 and L3

W840614 Bus Bar Stud Mounting Details

W840616 Melter Frame Nozzle Template

W840617 Melter Frame Nozzle Mounting Plate Details

W840618 Elevated Nozzle and Single Nozzle Templates

W840619 Melter Interface Drawing - Piping

W840620 Melter Interface Drawing – Instrument/Electrical

W840621 Melter Interface Drawing – Mechanical

P-PM-S-0084 Melter Vessel Assembly Sheet 1 – Dimensional Record Drawing

P-PM-S-0085 Melter Vessel Assembly Sheet 2 – Dimensional Record Drawing

P-PM-S-0086 Melter Vessel Assembly Sheet 3 – Dimensional Record Drawing

P-PM-S-0087 Melter Vessel Assembly Sheet 4 – Dimensional Record Drawing

P-PM-S-0088 Melter Vessel Assembly Sheet 5 – Dimensional Record Drawing

WSRC Form

OSR 45-4 Supplier Deviation Disposition Request (SDDR)

4.0 DESIGN CONDITIONS

4.1 General

4.1.1 The Melter Vessel Assembly is to be used in a highly radioactive cell to melt a slurry of glass frit mixed with radioactive waste sludge. The slurry enters the vessel through a pair of feed tubes located in the vessel head. It is melted at high temperatures and flows through a pour spout into canisters. The vessel is replaced periodically, e.g., due to refractory erosion, therefore the Melter Vessel Assembly is designed to be remotely removable and replaceable. Prior to removal, the vessel is emptied through a drain at the bottom of the vessel.

4.1.2 As the melter operation is highly radioactive, all equipment in the melt cell must be installed and removed using an overhead crane and remotely operated impact wrench. This includes the melter/frame assembly, all auxiliary equipment mounted on the melter top head nozzles and the service connections (jumpers). Each auxiliary assembly on the top head as well as its respective jumper must be interchangeable with spare equipment and with spare Melter Vessel Assemblies. This requires that all mounting surfaces be precisely located in three planes.

4.1.3 In order to insure interchangeability of subsequent assemblies, the close tolerance requirements shown in design drawings must be strictly adhered to. The Supplier must conduct all close tolerance work with respect to established datum references. Work in the Supplier's shop shall be performed under controlled temperature conditions as deemed necessary by the Supplier in order to achieve and maintain the specified dimensions and tolerances. The reference temperature for dimensions and tolerances is 68° F.

4.1.4 The Supplier shall submit written procedures which define how such features as centerlines, critical contours, dimensions, flatness and parallelism will be established, measured and controlled. The procedure shall, as a minimum, define the techniques to be used by the Supplier in performing his work in the following areas:

- Fabrication procedure to include facilities and machining equipment to be used in fabrication and assembly.

- Preheat procedures and stress relieving procedures to be used by the Supplier in fabrication.

- Optical/Electrical alignment procedures detailing methods and optical/electronic equipment, to be furnished by the Supplier, for maintaining and verifying dimensional and tolerance control requirements.

- M & TE calibration procedures detailing methods, frequency and verification of the calibration for precision measurement instruments.

- Shipping/Packaging procedure identifying special procedures to be used during shipment in order to maintain dimensional and tolerance requirements and preclude damage to projecting dowel pins, threaded studs, etc.

4.1.5 Design of all components and assemblies shall minimize crevices, pockets, absorbent materials or similar voids where contaminants can be trapped to facilitate decontamination prior to disposal. Intermittent welds are not permitted. Crevices shall, to the extent possible, be seal welded. Design shall avoid bolted or similar joints which cannot be seal welded, excess exposed bolt threads or provide for means to prevent accumulation of contaminants (e.g. coverings or sealants) in such joints.

4.1.6 Unless otherwise noted in design documents, installation of bolted connections shall be performed using a staggered crisscross torquing pattern. No more than one third of the final torque should be achieved during a single step.

4.2 Drawings

General Drawing Requirements are shown in Specification M-SPC-S-00001, "Project Specification for Project Requirements for Purchase Orders for the Defense Waste Processing Facility". Dimensioning and tolerancing on drawings shall be in accordance with ANSI Y14.5M. Use of dimensional record drawings is detailed in Specification G-6.

4.3 Environment

The operating environment for the Melter Vessel Assembly is as follows. All Supplier furnished material shall be suitable for the conditions specified. Documentation shall be available to WSRC upon request.

4.3.1 Radiation

Equipment located outside of the vessel but inside the Melter Vessel Assembly is subject to a maximum unshielded integrated dose of 2×10^7 rads over the 2 to 3 year melter life.

4.3.2 Humidity

All equipment covered by this specification shall be designed to operate over a relative humidity range of 20% to 100%.

4.3.3 Temperature

Ambient temperature in the melt cell during operation is 95°F optimum, 104°F maximum. Components in direct or close contact with the melter containing molten glass will, however, reach a higher temperature. Such conditions are separately addressed in the other reference Specifications and/or design documents.

5.0 MATERIALS

5.1 Material Control

5.1.1 All material shall be clearly segregated, protected, controlled, marked and stored. All stainless steel and nickel-based alloy materials shall be identified with a heat number prior to and during fabrication. Material withdrawal and use shall be made only against written procedures. No unauthorized persons shall have access to material. There shall be no possibility of mixing materials. Materials for other jobs shall not be stored in the same area. The requirements in Section 5.1.5 as to contact with carbon steel are applicable.

5.1.2 The Supplier shall prepare and submit Material Control Procedures, to include weld filler material, which describe the controls required by Section 5.1.

5.1.3 The Supplier shall identify all materials (plate, forging, pipe, bolting, etc.) by ASME/ASTM designation, ASME/ASTM alloy designation, respective ASME/ASTM class and UNS Number (unified numbering system). The mill ASME or ASTM ink marking should remain to the extent possible on the fabricated components. Identifying marks made by die stamping using low stress metal stamps is acceptable. They shall be placed on the material side that will not be exposed to process fluid after the vessel is placed in service. No stamping is permitted on the process side. Vibratool markings are not permitted except for workmanship samples.

5.1.4 One (1) copy of CMTR's shall be provided for all material in accordance with Attachment 11.2, "Quality Verification Document Requirements." Where CMTR's are not commonly furnished (e.g. for stock hardware components, gaskets, water quality, NDE materials, lubricants, etc.) Certificates of Compliance (COC's) may be acceptable. Such cases shall be submitted to WSRC for review and acceptance. All COC's shall meet the following conditions.

- The certification system, including the procedures for completing, reviewing and approving the certificate are described in the Supplier's quality assurance program.
- The certificate identifies the Supplier's quality program by name and revision number, identifies the purchased item or service by name, and includes a unique identification number (that is, purchase order number, project number, part number).
- The certificate identifies the specific procurement requirements met by the purchased item. This is accomplished by including a list of the specific requirements or by providing a copy of the purchase order and the procurement specifications or drawings with the certificate. The procurement requirements identified include any approved changes, waivers or deviations.
- The certificate identifies any procurement requirements not met, together with an explanation and the means to resolve the nonconformance.
- The person who is responsible for the quality functions and whose function is described in the Supplier's quality program signs or otherwise authenticates the certificate.

5.1.5 Contamination of Materials

5.1.5.1 There shall be no contamination of the stainless steel or nickel-based alloys with carbon steels. Contact with clean carbon steel racks, bed plates, cutting tables, boring mills, etc., is permitted, but only when a complete inspection of the contact surfaces is done prior to any material lay down. Any of the above carbon steel surfaces shall be brushed and wiped clean of loose scale, rust or steel particles that could become embedded in the stainless steels or nickel alloys. Wood supports are preferred to minimize risk of damage to the vessel plates during placing and removal.

5.1.5.2 Specification M-SPC-S-00005, "Chemical Requirements for Materials Used in Contact with Austenitic Stainless Steel, Nickel and Alloys," provides the requirements for materials used in

contact with austenitic stainless steel and non-ferrous metals. This Specification applies to all materials (e.g. lubricants, coolants, NDE materials, cleaners, hydrotest water, packing materials, etc.) which come in contact with the Melter Vessel Assembly and/or its components. These requirements shall be implemented by the Supplier.

5.1.5.3 During fabrication direct surface contact under pressure of carbon steel against stainless steel or nickel-based alloys, such as when forming, shall not be permitted. A durable separation layer that maintains its surface integrity during the pressure/forming operation shall be provided. This requirement may, at WSRC's discretion, be waived if the area of pressure contact with carbon steel is subsequently removed by machining. There shall be separation control for all vessel materials and all respective welding electrodes.

5.1.5.4 Upon completion of fabrication, examination, and tests, the metal surfaces shall comply with the requirements of Specification M-SPC-S-00005. The Supplier's Material Control Procedures shall describe the actions to be taken in the event of material contamination. Cleaning and protection of materials as required shall also be addressed.

5.2 Surface Finish

5.2.1 At the end of the life of each Melter Vessel Assembly, the equipment will be decommissioned, decontaminated and eventually interred in a suitable disposal facility. In order to permit maximum decontamination, the quality of material surface finish is described below. Strict compliance with these criteria will be required for all Melter Vessel Assembly material.

5.2.2 Unless otherwise specified on design drawings, surface finish for various material forms shall be as follows. Plates shall be finished in accordance with ASTM A480 Section 13, Paragraph 13.1.2, hot-rolled, annealed and pickled No. 1 finish. A shot or grit blasted surface is not acceptable. Sheets shall be finished in accordance with ASTM A480 Section 11, Paragraph 11.1.1, No. 1 finish. Strips shall be finished in accordance with ASTM A480 Section 12, Paragraph 12.1.1, No. 1 finish.

5.2.3 Unless otherwise specified on the design drawings machined surfaces are to have a 125AA finish according to ASME B46.1.

5.2.4 No arc strikes, nicks, gouges or other surface defects are permitted. Defects greater than 1/16-inch in depth and those which violate the minimum wall thickness requirement (as specified on design drawings) shall be repaired by welding and grinding to restore the original surface contour. Defects with a maximum depth of 1/16-inch and less shall be blended into the surrounding area by grinding, sanding, or both. Grinding shall be performed using 125 grit or finer abrasive wheels. No defects or grinding marks deeper than those left by a 125 grit abrasive wheel are permitted. (The entire surface shall meet the finish quality standards set by the samples submitted per Section 5.2.7.)

5.2.5 All welds shall be continuous, sound and uniform in size throughout the entire length. Welds shall be smooth and blended into the base metal. The contents of Section 5.2.4 apply.

5.2.6 Surface finish of other items not specifically addressed herein shall be similar to that described above or otherwise comply with the intent of Section 5.2.4.

5.2.7 To ensure that a mutually agreeable interpretation of surface finish requirements is established prior to start of fabrication, samples of stainless steel material and weldments (for each material type and for each weld type) which have finishes indicative of the above requirements shall be submitted. Upon acceptance by WSRC, these samples will be used by the WSRC SSR as comparators for determining acceptable finish quality in the supplied

equipment.

5.2.8 Abrasive blasting as a means of descaling new material is not permitted. Blasting using glass beads may be acceptable for the removal of scale resulting from heat treatment of assembled components which cannot practically be pickled. A sample of the surface finish which results from the Supplier's intended procedure shall be submitted with the procedure for review prior to blasting on Assembly components in accordance with Attachment 11.1.

5.3 Welding

5.3.1 All welding, including weld procedures, procedure qualification records, filler metal selection, preheat and weld repair, shall be as follows. Stainless steel structural welding shall be in accordance with AWS D1.6 and Specification G-307A, "Welding Requirements of Carbon Steel, Stainless Steel and Nickel Alloy Critical Fabricated Components." Welding of the vessel and vessel components which comply with ASME Section VIII shall be in accordance with Specification M-SPC-S-00004, "Welding Requirements for Austenitic Stainless Steel and Nickel Alloys for ASME Section VIII Vessels and Components". Welding of all piping/conduit shall be in accordance with ASME B31.3 and Specification P-501. Weld procedures and qualifications records shall be submitted for WSRC review and acceptance. A Weld Procedure Control Sheet shall be submitted concurrent with the weld procedures in accordance with Specifications G-307A and M-SPC-S-00004. This requirement may be waived provided typical weld details are included with the detail drawings with the weld procedures and NDE requirements as noted.

5.3.2 All welders and welding operators shall be qualified in accordance with ASME Section IX. Welder performance qualifications and the Supplier welder qualifications program for shop procedures will be reviewed in the supplier's shop by the WSRC SSR.

5.4 Repairs

5.4.1 The Supplier shall prepare and submit for review a complete repair procedure. All repairs shall be in accordance with the applicable procedures. The repair procedure shall include as a minimum:

a) Type and extent of repairable defects

b) Defect removal methods including NDE methods to assure complete defect removal

c) Repair method including weld preparation, treatment and reference to ASME Section IX qualified weld procedures

d) Nondestructive examination methods to verify repairs

5.4.2 Major repairs require specific written review by WSRC. Methods of repair shall be in accordance with the Supplier's procedure. Major repairs shall be defined in the Supplier's procedure and shall include as a minimum hydrostatic test failures, weld cracking, base metal repairs (other than minor nicks and gouges), and any single repair made more than twice. The Supplier shall advise WSRC and receive prior concurrence before making any major repair.

5.4.3 The Supplier shall prepare and transmit Major Repair Verification Reports in accordance with Attachment 11.2.

6.0 TESTING, INSPECTION AND CERTIFICATION

6.1 Nondestructive examination of welds shall be performed by the Supplier in accordance with the Supplier's written procedures for liquid penetrant, radiographic and ultrasonic examinations. Type of NDE examinations shall be in accordance with Specification M-501, Section 7.3.2, for the vessel, and Specification S-501, Section 7.1, for structural welds. Unless otherwise noted, nondestructive examination methods and acceptance criteria shall be in accordance with ASME Section V, ASME Section VIII, Specification M-SPC-S-00004, Specification G-307A and ASME B31.3. NDE procedures shall be submitted for WSRC review and acceptance in accordance with Attachment 11.1. NDE test reports shall be submitted to WSRC in accordance with Attachment 11.2.

6.1.1 Personnel performing nondestructive examination shall be qualified in accordance with ASNT Standard SNT-TC-1A or approved equal. Personnel certifications and the supplier's personnel qualification program for shop procedures will be reviewed at the Supplier's shop by the WSRC SSR.

6.2 Dimensional inspections shall be made of components as called for in detailed Specifications. Inspections will be performed by the Supplier and by WSRC personnel and the results recorded as specified below.

6.2.1 Supplier Measurements

6.2.1.1 After completion of heat treatment of the melter vessel and top head, following welding of all nozzles and all machining, the Supplier shall measure and record critical dimensions and contours. Supplier shall submit Interim Dimensional Inspection Drawings to WSRC for review and acceptance prior to performing the interim inspection. Sample interim inspection drawings are available and will be provided upon request. After Suppliers completion of the interim inspection, the results shall be recorded on the interim dimensional inspection drawings. The inspection results shall be submitted to WSRC for review and acceptance. This interim inspection shall include:

- All nozzle critical dimensions
- Vessel shell, bottom head and top head contours
- Vessel flange machined dimensions
- Vessel bottom flange machined dimensions
- Bottom head drain valve support locations
- Top head flange machined dimensions
- Top head lifting lug locations
- Riser and riser end (nozzles H, H1 and K) critical dimensions

6.2.1.2 After completion of fabrication and assembly, the Supplier shall check critical dimensions of the melter vessel assembly using the approved procedures per Section 4.1.4. A dimensional inspection of equipment shall be made by the Supplier. Dimensional record drawings will be provided by WSRC. On these drawings, the Supplier will record all dimensions specifically required for the Dimensional Record effort. These drawings shall be processed in accordance with Specification G-6, "Supplier Handling of Dimensional Record Drawings."

6.2.1.3 The Supplier shall use calibrated precision measuring devices and techniques. Optical alignment and measuring methods shall be used, including, as a minimum, jig transits and levels with optical micrometers and precision alignment scales.

The Supplier shall submit a detailed procedure for the Interim/Final Dimensional Record Inspection. These shall include:

i) Methods of measurement applicable to specific components or assemblies

ii) Type of measuring device used

iii) Methods, frequency and verification of calibration for the precision measurement devices.

6.2.1.4 The Supplier shall record, on the provided Dimensional Record drawings, the actual as-built dimensions that locate or define a remotable surface with respect to a) Melter Vessel locations shown on drawings or b) another remotable surface. Remotable surfaces are defined as nozzle or electrical connector centerline and mating faces, dowel pins, or holes, Acme studs or holes, mating plate surfaces, guide plates, etc.

6.2.1.5 The Supplier shall submit dimensional inspection area drawings for acceptance (ref. Section 7.2.2).

7.0 WSRC INSPECTIONS

7.1 WSRC reserves the right of access to any and all activities deemed necessary to assure contract compliance. WSRC shall give prior notification for these activities to the Supplier. The required SSR activities will be scheduled by the Supplier so as not to jeopardize the promised delivery date. Surveillance by SSR does not relieve the Supplier of the responsibility for complying with the requirements of the purchase order.

7.1.1 Quality surveillance is the selective review, observation and evaluation of processes, procurement, manufacturing, operations and quality control programs to determine Supplier's compliance with the contractual requirements of the purchase order. The Supplier shall notify the WSRC SSR at least 7 days prior to the start of a scheduled witness/hold point.

7.1.2 The following witness and hold points, and those identified in the reference specifications, are established for the Melter Vessel/Frame Assembly:

Witness Points

- Materials of Construction
- Welding – first time use of each different welding process
- Nondestructive Testing – first time use of each process
- Heat Treatment(s)
- Setting of Vessel Assembly in Lower Support Frame
- Final Dimensional Inspection
- Preparation for Shipment

Hold Points

- First UNS N06690 to UNS N06690 and UNS N06690 to Stainless Steel Welding Operation
- Major Weld Repairs
- Nondestructive Testing of Nozzles "A" and "T"
- Halide/Helium Leak Tests
- Hydrostatic Testing of the Vessel and Vessel, Bottom and Top Head Water Jackets

- Mechanical and Electrical Testing
- Final Inspection – cleanliness, material contamination and weld splatter
- Documentation Review
- Release for Shipment

7.2 Dimensional Inspection

i) After the Supplier's interim dimensional inspection and records are completed and acceptable, a WSRC hold point will be initiated. The melter vessel and top head shall be measured in the suppliers shop by WSRC personnel. This hold point inspection will take approximately 5 working days. These dimensions shall be recorded by WSRC on the same drawings as the Supplier's interim dimensional inspection.

ii) After the Supplier's final dimensional inspection and records are completed and acceptable, a WSRC hold point will be initiated. The Melter Vessel Assembly shall be measured in the suppliers shop by WSRC personnel. This hold point inspection will take approximately 5 working days. These dimensions shall be recorded by WSRC on the same drawings as the Supplier's as-built dimensions.

iii) These activities are in addition to, and do not take the place of the Supplier's measurements and other Supplier requirements in this specification.

iv) WSRC will repeat this inspection at Savannah River Site at the time the assembly arrives from the Supplier. The results of these checks will be used as criteria for acceptance of the Supplier's work. Approximately ten (10) working days will be required to perform these activities.

7.2.1 Items by WSRC

WSRC will furnish their own measuring instruments.

7.2.2 Items by Supplier

WSRC will perform interim and final dimensional inspections at the Supplier's shop. The Supplier shall provide the following:

i) Measurement Area

The Supplier shall provide a measurement area, dedicated to WSRC's exclusive use. This area shall include:

- A surface with areas of support for the melter support frame level within ±.0025".
- 30 feet of head room to the bottom of the crane hook.
- Enclosures or partitions.
- Temperature controlled at 68°F ± 5°F during measurement for Dimensional Record Drawings. The Supplier shall furnish thermometers.
- Clear space of at least 7 feet surrounding the Melter Vessel Assembly.

- Rigid supports for optical transits and tables. These shall be set up perpendicular to the Melter centerlines, and be a minimum of 10 feet away from the frame, and at least 3 feet higher than the frame.

- Substantial platforms, ladders, stairs, and handrails, all meeting the requirements of 29CFR Part 1910, Occupational Safety and Health Requirements, Subpart D "Walking—Working surfaces.

- Lighting suitable for optical measurements. This shall be an average of 100 foot candles in the area where measurements will be made.

- Secure storage of WSRC's optical instruments when not in use.

- This area must be solely for WSRC's use when measurements are being made.

7.3 Final acceptance of the delivered equipment will be after inspection by WSRC personnel who will verify in the mockup shop that the dimensions listed on each relevant Dimensional Record drawing are within the acceptable tolerance range.

8.0 QUALITY REQUIREMENTS

8.1 Supplier's Quality Program shall be in accordance with Attachment 11.3, Supplier Quality Assurance Program Requirements.

8.2 A copy of the Supplier's Quality Assurance Manual shall be submitted with their proposal for WSRC review and acceptance.

9.0 PREPARATION FOR SHIPMENT

9.1 The Supplier shall perform all necessary packing to prepare the partially assembled Melter Assembly for shipment to Savannah River Site.

9.2 The Supplier shall conform to Specification M-SPC-S-00001, Section 6.0 when preparing items for shipment.

9.2.1 In addition to the wood nozzle covers required by Specification M-SPC-S-00001, the Supplier shall provide and install a steel cover on the shell main flange. The steel cover shall not come in contact with the stainless steel flange surface.

9.3 Deleted.

9.4 Estimated shipping weights are as follows:

Melter Vessel Assembly 81,000 lbs

Melter Top Head 12,000 lbs

10.0 DOCUMENTATION

10.1 The Supplier shall provide shop detail and fabrication drawings and all other documentation required as defined in Attachments 11.1 and 11.2 of this specification.

10.2 The Supplier shall be responsible for supplying a complete drawing index listing all drawings

to be provided by the Supplier. The index will also show schedule dates for submittal of these drawings. Submittal dates shall be in accordance with the requirements of the documents in Section 10.1.

11.0 ATTACHMENTS

11.1 Engineering Document Requirements, OSR Form 45-6, (3 pages)

11.2 Quality Verification Document Requirements, OSR Form 45-5, (2 pages)

11.3 Supplier Quality Assurance Program Requirements, OSR Form 19-283 (1 page)

Engineering Document Requirements

1. Document Category Number	2. Specification Paragraph Reference	3. Document Description	4. Permission to Proceed Required		5. Submittal Schedule	6. Quantity Required		7. Kind of Copies	8. Remarks
			Yes	No		Init	Final		
25.0	4.1.4	Fabrication Procedure	X		90 Days A.R.O	3		Print	A.R.O. = After Receipt of Order
12.0	5.3.1	(Vessel) Weld Procedure Specifications	X		"	3		"	
12.0	5.3.1	(Vessel) Weld Procedure Qualification Records	X		"	3		"	
16.0	4.1.4	Preheat Procedures	X		"	3		"	
25.0	4.1.4	Optical/Electrical Alignment Procedure	X		"	3		"	
25.0	4.1.4	M &TE Calibration Procedures	X		"	3		"	
29.0	4.1.4	Shipping/Packaging Procedure	X		"	3		"	
13.0	5.1.2	Material Control Procedure	X		"	3		"	
10.2	5.2.7	Material/Weldment Samples	X		"	1		N/A	
14.0	5.4.1	Weld Repair Procedure	X		"	3		Print	
22.0	6.1	Liquid Penetrant Examination Procedure	X		"	3		"	
20.0	6.1	Radiographic Examination Procedure	X		"	3		"	
19.0	6.1	Ultrasonic Examination Procedure	X		"	3		"	
25.0	6.2.1.3	Interim/Final Dim. Record Inspection Proc.	X		"	3		"	
1.1	6.2.1.5	Dimensional Inspection Area Drawings	X		"	3		"	
6.0	8.2	Supplier's Quality Assurance Manual	X		With Proposal	3		"	
1.3	10.1	Shop Fabrication Detail Drawings	X		90 Days A.R.O.	3		"	
5.0	10.2	Drawing Index Schedule	X		"	3		"	
13.0	5.1.2	Weld Filler Material Control Procedure	X		"	3		"	
16.0	4.1.4	Stress Relieving Procedures	X		"	3		"	
11.0	5.1.4	Certificate of Conformance	X		As Required	1		"	
15.0	5.2.8	Alternate Material Blasting Procedure	X		90 Days A.R.O.	3		"	
12.0	5.3.1	(Structural) Weld Procedure Specification	X		"	3		"	
12.0	5.3.1	(Structural) Weld Proc. Qualification Records	X		"	3		"	
12.0	5.3.1	(Piping) Weld Procedure Specifications	X		"	3		"	
12.0	5.3.1	(Piping) Weld Proc. Qualification Records	X		"	3		"	
14.0	5.3.1	(Vessel) Weld Procedure Control Sheet	X		"	3		"	

OSR 45-6B# (Rev 8-27-91)

Engineering Document Requirements

Attachment No. 11.1
Revision No. 6
Spec/Req'n No. M-500

1. Document Category Number	2. Specification Paragraph Reference	3. Document Description	4. Permission to Proceed Required		5. Submittal Schedule	6. Quantity Required		7. Kind of Copies	8. Remarks
			Yes	No		Init	Final		
14.0	5.3.1	(Structural) Weld Procedure Control Sheet	X		90 Days A.R.O.	3		Print	
1.3	6.2.1.1	Interim Dimensional Inspection Drawings	X		"	3		"	
1.3	6.2.1.1	Interim Dimensional Inspection Results	X		"	3		"	

Engineering Document Requirements Form Instructions

Purpose The Engineering Document Requirements (EDR) form is prepared by the originator, establishes a basis for actions required of a Supplier and provides the schedule for the submittal of engineering documents by the Supplier.

Legend

Entry No. **Information Required**

1 Document category number — see below.
2 Applicable specification number and appropriate paragraph.
3 Description corresponding to document category number.
4 Permission to proceed with fabrication or other specific processes is marked yes, if required.
5 List a milestone after award i.e., prior to fabrication, prior to test, prior to shipment, or with shipment that the listed document is to be submitted by S
6 Number of copies required for submittal.
7 Reproducible, Mylar, Vellum, etc.
8 Enter remarks when appropriate.

Document Category Number and Descriptions

1.0 Drawings
- 1.1 Outline Dimensions, Services, Foundations and Mounting Details — Drawings providing external envelope, including lugs, centerline(s), location an for electrical cable, conduit, fluid, and other service connections, isometrics and details related to foundations and mountings.
- 1.2 Assembly Drawings — Detailed drawings indicating sufficient information to facilitate assembly of the component parts of an equipment item.
- 1.3 Shop Detail Drawings — Drawings which provide sufficient detail to facilitate fabrication, manufacture, or installation. This includes pipe spool draw internal piping and wiring details, cross-section details and structural and architectural details.
- 1.4 Wiring Diagrams — Drawings which show schematic diagram equipment, internal wiring diagrams, and interconnection wiring diagram for electrical
- 1.5 Control Logic Diagrams — Drawings which show paths which input signals must follow to accomplish the required responses.
- 1.6 Piping and Instrumentation Diagrams — Drawings which show piping system scheme and control elements.

2.0 Parts Lists and Costs — Sectional view with identified parts and recommended spare parts for one year's operation and specified with unit cost.

3.0 Complete WSRC Data Sheets — Information provided by Supplier on data sheets furnished by WSRC.

4.0 Instructions
- 4.1 Erection/Installation — Detailed written procedures, instructions, and drawings required to erect or install material or equipment.
- 4.2 Operations — Detailed written instructions describing how an item or system should be operated.
- 4.3 Maintenance — Detailed written instructions required to disassemble, reassemble and maintain items or systems in an operating condition.
- 4.4 Site Storage and Handling — Detailed written instructions, requirements and time period for lubrication, rotation, heating, lifting or other handling requirements to prevent damage or deterioration during storage and handling at jobsite. This includes shipping instruction for return.

5.0 Schedules: Engineering and Fabrication/Erection — Bar charts or critical path method diagram which detail the chronological sequence of activities, i.e., Engineering submittals, fabrication and shipment.

6.0 Quality Assurance Manual/Procedures — The document(s) which describe(s) the planned and systematic measures that are used to assure that structure systems, and components will meet the requirements of the procurement documents.

7.0 Seismic Data Reports — The analytical or test report which provides information and demonstrates suitability of material, component or system in relation conditions imposed by the stated seismic criteria.

8.0 Analysis and Design Reports — The analytical data (stress, electrical loading, fluid dynamics, design verification reports, etc.) which demonstrate that an i satisfies specified requirements.

9.0 Acoustic Data Reports — The noise, sound and other acoustic vibration data required by the procurement documents.

10.0 Samples
- 10.1 Typical Quality Verification Documents — A representative data package which will be submitted for the items furnished as required in the procurer documents.
- 10.2 Typical Material Used — a representative example of the material to be used.

11.0 Material Descriptions — The technical data describing a material which a Supplier proposes to use. This usually applies to architectural items, e.g., metal decking, doors, paints, coatings.

12.0 Welding Procedures and Qualifications — The welding procedure, specification and supporting qualification records required for welding, hard facing, ove brazing and soldering.

13.0 Material Control Procedures — The procedures for controlling issuance, handling, storage and traceability of materials such as weld rod.

14.0 Repair Procedures — The procedures for controlling material removal and replacement by welding, brazing, etc., subsequent thermal treatments, and fina acceptance inspection.

15.0 Cleaning and Coating Procedures — The procedures for removal of dirt, grease or other surface contamination, and preparation and application of protect coatings.

16.0 Heat Treatment Procedures — The procedures for controlling temperature and time at temperature as a function of thickness, furnace atmosphere, coolin and methods, etc.

19.0 UT — Ultrasonic Examination Procedures — Procedures for detecting discontinuities and inclusions in materials by the use of high frequency acoustic en

20.0 RT — Radiographic Examination Procedures — Procedures for detecting discontinuities and inclusions in materials by x-ray or gamma ray exposure of photographic film.

21.0 MT — Magnetic Particle Examination Procedures — Procedures for detecting surface or near surface discontinuities in magnetic materials by the distortio applied magnetic field.

22.0 PT — Liquid Penetrant Examination Procedures — Procedures for detecting discontinuities in materials by the application of a penetrating liquid in conjun with suitable developing materials.

23.0 Eddy Current Examination Procedures — Procedures for detecting discontinuities in materials by distortion of an applied electromagnetic field.

24.0 Pressure Test — Hydro, Air, Leak, Bubble or Vacuum Test Procedures — Procedures for performing hydrostatic or pneumatic structural integrity and leak tests.

25.0 Inspection Procedures — Organized process followed for the purpose of determining that specified requirements (dimensions, properties, performance re etc.) are met.

26.0 Performance Test Procedures — Test performed to demonstrate that functional design and operational parameters are met.
- 26.1 Mechanical Tests — e.g., pump performance, data, valve stroking, load, temperature rise, calibration, environmental, etc.
- 26.2 Electrical Tests — e.g., impulse, overload, continuity, voltage, temperature rise, calibration, saturation, loss, etc.

27.0 Prototype Test Reports — Reports of a test which is performed on a standard or typical examination of equipment or item, and which is not required for ea produced in order to substantiate the acceptability of equal items. This may include tests which result in damage to the item(s) tested.

28.0 Personnel Qualification Procedures — Procedures for qualifying welders, inspectors and other special process personnel.

29.0 Supplier Shipping Preparation Procedures — Procedures used by a Supplier to prepare finished materials or equipment for shipment from its facility to the jobsite.

Attachment No. 11.2
Revision No. 6
Spec/Req'n No. M-500
Page 1 of 2

Quality Verification Document Requirements

1. Document Category Number	2. Specification Paragraph Reference	3. Document Description	4. SSR Release	5. WSRC Receipt Inspection Check-In	6. Remarks	7. DOC Supplier Page Count
17.1	5.1.4	Certified Material Test Reports and COC (as required)				
14.0	5.4.3	Major Repair Verification Reports				
19.0	6.1	Ultrasonic Examination Test Reports				
20.0	6.1	Radiographic Examination Test Reports				
22.0	6.1	Liquid Penetrant Examination Test Reports				

8. Supplier's Order No.	9. Supplier's Part	10. Supplier's Part Name	11. Quantity

12. PO No.	13. WSRC Line/Equip Tag or Code No.	14. WSRC Part Name

15. Supplier's Conformance Statement

We certify that the work and required documents meet the requirements of the procuring documents.

Authorized Supplier Signature _____ Title _____ Date _____

16. Source Surveillance Representative at Suppliers Facility

Work was released based on satisfactory completion of quality surveillance and review of documentation.

☐ With Authorized Deviations Noted in Column 6
☐ No Deviations

Signature of SSR _____ Date _____

17. Receiving Inspection at SRS

This form and the quality verification documents referenced hereon have been received and their relationship to the hardware items verified.

Signature of WSRC Inspector _____ Date _____

Quality Verification Document Requirements Form Instructions

Purpose The Quality Verification document Requirements (QVDR) is initiated by SRS and completed by the Supplier when providing quality verification documents. The QVDR is a multipurpose form to

Transmit quality verification documents from the Supplier,
Provide evidence of SSR release of documentation and/or work, and
Provide evidence of an SRS inspection check of documentation received at SRS.

WSRC Entries

Entry No.	Information Required
1	Enter Document Category Number — see below.
2	Enter Specification Number and Paragraph Reference.
3	Enter Description corresponding to the Document Category Number.
4	SSR to initial upon item release.
6	Enter "Remarks: as appropriate.
16	SSR and dates release.

Field Entries

Entry No.	Information Required
5	SRS inspector at the jobsite to complete check-in.
17	The SRS Inspector will review the quality verification documentation package. If found satisfactory, he signs and dates the check-in statement.

Supplier Entries

Entry No.	Information Required
7	Enter number of pages of quality verification document being submitted.
8	Enter information required.
9	Enter information required.
10	Enter information required.
11	Enter the quantity of units covered by the documents submitted. For each item on Entry No. 12 being released, provide a separate copy of this completed form and the supporting quality verification documents.
12	Enter information required.
13	Enter information required.
14	Enter information required.
15	Supplier — Signature of an employee authorized to sign such documents.

Document Category Numbers and Descriptions

12.0 Welding Verification Reports — Reports of welding performed to include weld identification, and certification that qualified welding procedures and welders were used.

13.0 Material Verification Reports — Reports relative to material which confirm, substantiate or assure that an activity or condition has been implemented in conformance with code and material specifications imposed by the procurement documents.

14.0 Major Repair Verification Reports — Reports may include weld repair locations (maps), material test reports for filler metal, pre- and post-weld heat treatment records, NDE records, etc. The resolution of whether a repair is major or not is an SRS responsibility.

15.0 Cleaning and Coating Verification Reports — Reports include a certification of visual examination for surface preparation, surface profile, materials, etc.; and also humidity data, temperature data and coating thickness data as required by the procurement documents.

16.0 Heat Treat Reports — Reports normally include furnace charts and similar records which identify and certify the item(s) treated, the procedure used, furnace atmosphere, time at temperature, cooling rate, etc.

17.0 Material Property Reports
- 17.1 MTR (Material Test Reports) — These reports include all chemical, physical, mechanical, and electrical property test data required by the material specification and applicable codes. These are applicable to cement, concrete, metals, cable jacket materials, rebar, rebar splices, etc.
- 17.2 Impact Test Data — Reports of Charpy or drop weight tests including specimen configuration, test temperature and fracture data.
- 17.3 Ferrite Data — Reports of the ferrite percentage for stainless steel materials used, including castings and welding filler metals as deposited.
- 17.4 Material Certificate of Conformance — Documents which certify conformance to the requirements of the applicable material specification.
- 17.5 Electrical Property Reports — Reports of electrical characteristics, e.g., dielectric, impedance, resistance, flame tests, corona, etc.

18.0 Code Compliance — Verifying documents (such as data Forms U-1, M-2, State, etc.), which are prepared by the manufacturer or installer and certified by the Authorized Code Inspector.

19.0 UT — Ultrasonic Examination and Verification Reports — Examination results of certain characteristics of discontinuities and inclusions in material by the use of high frequency acoustic energy.

20.0 RT — Radiographic Examination and Verification Reports — Examination results of certain characteristics of discontinuities and inclusions in materials by x-ray or gamma-ray exposure of photographic film, including film itself.

21.0 MT — Magnetic Particle Examination and Verification Reports — Examination results of surface (or near surface) discontinuities in magnetic materials by distortion of an applied magnetic field.

22.0 PT — Liquid Penetrant Examination and Verification Reports — Examination results of surface discontinuities in materials by application of a penetrating liquid in conjunction with suitable developing techniques.

23.0 Eddy Current Examination and Verification Reports — Examination results of discontinuities in material by distortion of an applied electromagnetic field.

24.0 Pressure Test — Hydro, Air, Leak, Bubble or Vacuum Test and Verification Reports — Results of hydrostatic or pneumatic structural integrity and leakage tests.

25.0 Inspection and Verification Reports — Documented findings resulting from an inspection.

26.0 Performance Test and Verification Reports — Reports of Test Results
- 26.1 Mechanical Test, e.g., pump, performance data, valve stroking, load, temperature rise, calibration, environment, etc.
- 26.2 Electrical Tests, e.g., load, impulse, overload, continuity, voltage, temperature rise, calibration, saturation, loss, etc.

27.0 Prototype Test Report — Report of the test which is performed on a standard or typical example of equipment, material or item, and which is not required for each item produced in order to substantiate the acceptability of equal items. This normally includes tests which may, or could be expected to, result in damage to the item(s) tested.

28.0 Certificate of Conformance—A document signed or otherwise authenticated by an authorized individual certifying the degree to which items or services meet specified requirements.

OSR 19-283 (Rev 10-3-2006)

Supplier Quality Assurance Program Requirements

Attachment No. 11.3
SPEC/Req'n No. M-500
Revision No. 6
Page 1 of 1

NOTE Any clarifications/supplements and/or exceptions shall be listed below (if required, add a continuation sheet). Level 1 requirements are subject to evaluation and verification through the performance of an audit. For Level 2 procurements where Supplier quality is deemed necessary, the method(s) of assuring Supplier quality shall be identified in Section D.

Section A

ASME NQA-1 Part I Basic (Paragraph 100) Requirements

- ☒ Organization
- ☒ Quality Assurance Program
- ☒ Design Control
- ☒ Procurement Document Control
- ☒ Instructions, Procedures and Drawings
- ☒ Document Control
- ☒ Control of Purchased Items and Services
- ☒ Identification and Control of Items
- ☒ Control of Processes
- ☒ Inspection
- ☒ Test Control
- ☒ Control of Measuring and Test Equipment
- ☒ Handling, Storage and Shipping
- ☒ Inspection, Test and Operating Status
- ☒ Control of Nonconforming Items
- ☒ Corrective Action
- ☒ Quality Assurance Records
- ☐ Audits

Section B

Other Supplier Quality Program Requirements (ASME NQA-1 Part 1 Supplemental [Paragraphs 200-900] Requirements; ASME NQA-1 Part II Requirements; and other National Consensus Standards)

- ☐ NQA-1 Part II Subpart 2.7 (Software Quality Requirements)
- ☒ NQA-1 Part I Requirement 7, Paragraph 503 (C of C Requirements)
- ☐ ANSI/NCSL Z540-1, Part I (Calibration Standard)
- ☐ ASME Section VIII Division 1 (Appendix 10)
- ☐ ISO 17025 (Calibration/Testing Standard)
- ☒ Other _____
- ☐ Other NQA-1, Element 3, Supplemental Requirement 401, Use of Comp. Prog.
- ☐ Other _____

Section C

Clarification/Exceptions

Section D

Methods of Assuring Supplier Quality for Level 2 Procurements
For Level 2 Procurements, in addition to reviewing the Supplier's QA Manual, the items marked below shall be performed to assure Supplier quality (a minimum of one method shall be applied).

- ☐ Performance of an audit by QCS
- ☐ Performance of an audit by the requesting organization's CQF
- ☐ Document submittals identified on EDR document (e.g., process procedures, welder qualifications, etc.)
- ☐ Submittal of current applicable ASME certificate
- ☐ Supplier surveillance activities
- ☐ Receipt inspection activities
- ☐ Other _____
- ☐ Other _____